

61. (New) The bone graft substitute of claim 60, wherein said processing aid composition is selected from the group consisting of stearic acid, calcium stearate, magnesium stearate, natural polymer, synthetic polymer, sugar, glycerol, and combinations thereof.
62. (New) The bone graft substitute of claim 61, wherein said natural polymer is starch, gelatin, or combinations thereof.
63. (New) The bone graft substitute of claim 61, wherein said synthetic polymer is methylcellulose, sodium carboxymethylcellulose, or hydropropylmethylcellulose.
64. (New) The bone graft substitute of claim 59, wherein said allograft bone material is cortical-cancellous bone.
65. (New) The bone graft substitute of claim 59, wherein said allograft bone material is demineralized bone matrix.
66. (New) The bone graft substitute of claim 59, wherein said ceramic material is selected from the group consisting of hydroxylapatite, calcium sulphate, alumina, silica, calcium carbonate, calcium phosphate, calcium tartarate, bioactive glass, and combinations thereof.
67. (New) The bone graft substitute of claim 58, wherein said substitute further comprises a biological agent.
68. (New) The bone graft substitute of claim 67, wherein said biological agent is added to said material prior to said compaction step.
69. (New) The bone graft substitute of claim 67, wherein said biological agent is added to said bone graft substitute subsequent to said compaction step.
70. (New) The bone graft substitute of Claim 67, wherein said agent is selected from the group consisting of a growth factor, an antibiotic, a

strontium salt, a fluoride salt, a magnesium salt, a sodium salt, a bone morphogenetic factor, a chemotherapeutic agent, a pain killer, a bisphosphonate, a bone growth agent, an angiogenic factor, and combinations thereof.

- 58.1 (New) The bone graft substitute of Claim 70 wherein said growth factor is selected from the group consisting of platelet derived growth factor (PDGF), transforming growth factor  $\beta$  (TGF-  $\beta$ ), insulin-related growth factor-I (IGF-I), insulin-related growth factor-II (IGF-II), fibroblast growth factor (FGF), beta-2- microglobulin (BDGF II), bone morphogenetic protein (BMP), and combinations thereof.
72. (New) The bone graft substitute of Claim 70, wherein said antibiotic is selected from the group consisting of tetracycline hydrochloride, vancomycin, cephalosporins, and aminoglycocides such as tobramycin, gentamicin, and combinations thereof.
73. (New) The bone graft substitute of Claim 70, wherein said factor is selected from the group consisting of proteins of demineralized bone, demineralized bone matrix (DBM), bone protein (BP), bone morphogenetic protein (BMP), osteonectin, osteocalcin, osteogenin, and combinations thereof.
74. (New) The bone graft substitute of Claim 70, wherein said agent is selected from the group consisting of cis-platinum, ifosfamide, methotrexate, doxorubicin hydrochloride, and combinations thereof.
75. (New) The bone graft substitute of Claim 70, wherein said pain killer is selected from the group consisting of lidocaine hydrochloride, bipivacaine hydrochloride, non-steroidal anti-inflammatory drugs such as ketorolac tromethamine, and combinations thereof.
76. (New) The bone graft substitute of claim 58, wherein particles of said material are less than about 10 millimeters in diameter.

77. (New) The bone graft substitute of claim 58, wherein particles of said material are less than about 250  $\mu\text{m}$  in diameter.
78. (New) The bone graft substitute of claim 58, wherein particles of said material are in a range of about 50 to 180 microns.
79. (New) The bone graft substitute of claim 58, wherein said shape generally has the shape of a toy jack.
80. (New) The bone graft substitute of claim 58, wherein said shape is a three-dimensional six-armed star shape.
81. (New) The bone graft substitute of claim 58, wherein the shape comprises projections.
82. (New) The bone graft substitute of claim 58, wherein the shape comprises projections, indentations, or both.
83. (New) The bone graft substitute of claim 58, wherein said shape is for use as part of a three-dimensional interlocking array of particles.
84. (New) The bone graft substitute of claim 58, wherein said shape confers resistance to migration away from an implant site.
85. (New) The bone graft substitute of claim 58, wherein at least one surface of the shape has a relief profile.
86. (New) A three-dimensional intricately shaped bone graft substitute, made by a method comprising the steps of:
  - obtaining a bone material;
  - granulating said material; and

subjecting said bone material to a dry powder compaction process,  
wherein a three-dimensional intricate shape is formed by said dry  
powder compaction process.

87. (New) The bone graft substitute of claim 86, wherein said dry powder compaction process utilizes a withdrawal press, wherein said press comprises:

a stationary lower punch;  
a moveable die;  
a moveable upper punch; and

a moveable lower punch, wherein said stationary lower punch is contained within said moveable lower punch and wherein said moveable lower punch is contained within the moveable die.

88. (New) A three-dimensional intricately shaped bone graft substitute, made by a method comprising the steps of:

providing a stationary lower punch and a moveable lower punch which is vertically moveable about the stationary lower punch, a moveable die having at least one cavity that is vertically moveable about the moveable lower punch and positionable generally above the stationary lower punch, and a moveable upper punch that is vertically moveable inside the moveable die;

positioning the moveable die generally above the stationary lower punch;

positioning the moveable upper punch generally above the moveable die;

introducing a granulated bone material into the cavity of the moveable die;

moving the moveable upper punch to contact the bone material in opposition to the moveable lower punch and stationary lower punch; and

moving the moveable upper punch further into the cavity of the moveable die, moving the moveable die, and moving the moveable lower punch all at the same time but with different relative amplitudes,

whereby said moving steps form the material into the intricately shaped bone graft substitute.

89. (New) The bone graft substitute of claim 88, wherein the steps of the relative motions of the upper and lower punches effect a substantially uniform distribution of pressure within said material.
90. (New) The bone graft substitute of claim 88, wherein at least one of the moving steps applies a force to the material in a range of about 0.2 to about 5 tons.
91. (New) The bone graft substitute of claim 88, wherein at least one of the moving steps applies a force to the material in a range of about 0.2 to about 2 tons.
92. (New) The bone graft substitute of claim 88, wherein at least one of the moving steps applies a force to the material in a range of about 0.5 to about 1 ton.